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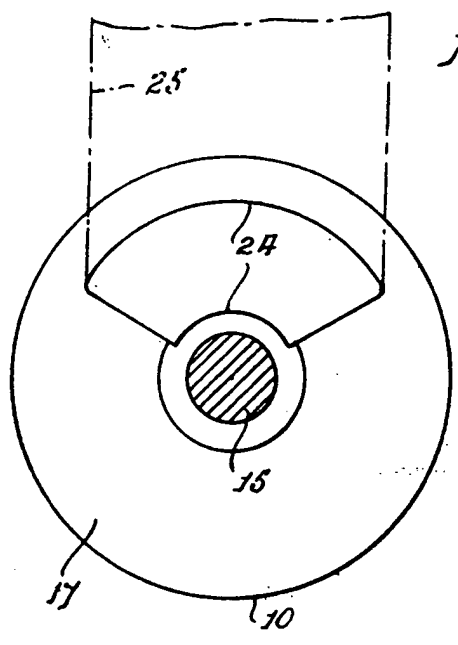


FIG. 3

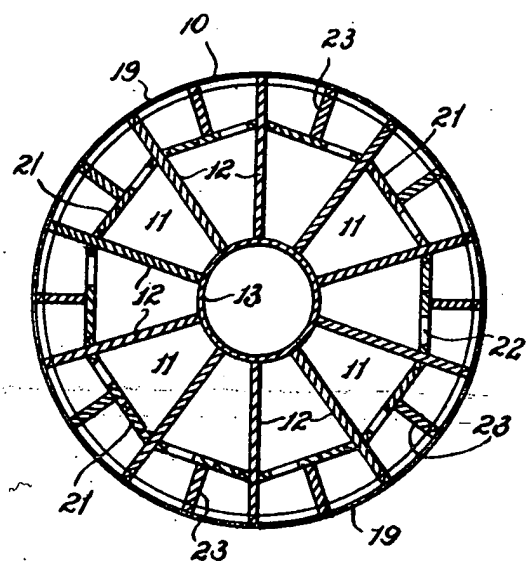


FIG. 2

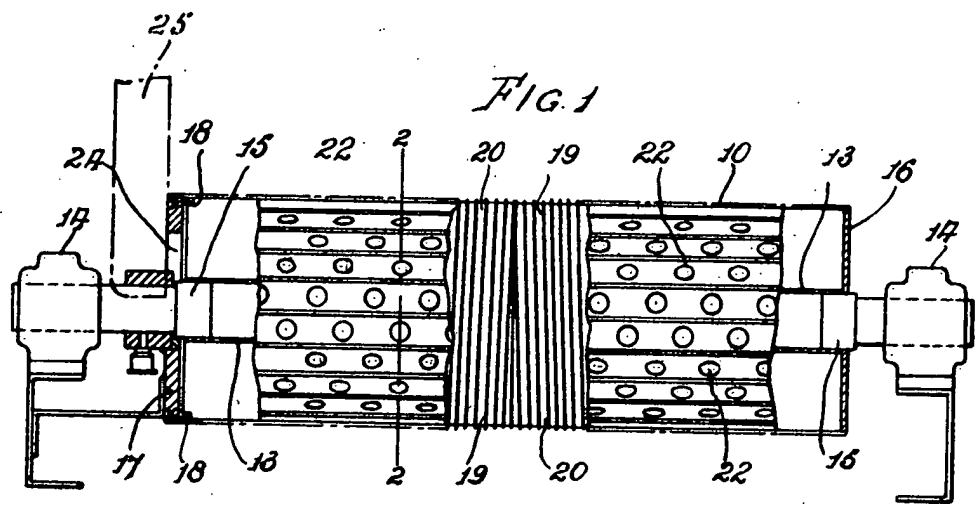


FIG. 1

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PATENT SPECIFICATION

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COMPLETE SPECIFICATION.

Improvements in and relating to Rolls or Cylinders for Drying and Cleaning the Felts of Paper-Making Machinery.

We, HALL & KAY LIMITED, a British Company, of Birch Mills, Ashton-under-Lyne, in the County of Lancaster, do hereby declare the invention, for which we pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to drying rolls or cylinders of the type used in paper-making machinery, such as Fourdrinier machines for drying and cleaning the felts of the machines by sucking dirt and moisture therefrom, and has for its object to provide an improved roll for this purpose which is cheaper to manufacture and use than rolls now used for the same purpose, and will be more efficient than such rolls.

In one prior known construction, the roll comprises a fixed pipe having a perforated wall and on this there is rotatably mounted a circular cage or cylinder which is also perforated. The felt to be dried or cleaned passes over part of the circumference of the cage or cylinder and rotates the latter and at the same time air is drawn from the fixed pipe so as to suck moisture and dirt from the felt.

The mounting of the circular cage so as to be rotatable on the fixed pipe is expensive as it has to be mounted on large roller bearings, and as the cage or cylinder is often deflected by the weight and pull of the fabric passing thereover, the seal between the fixed pipe and the cage tends to bind and is not always as air-tight as it should be, in spite of the large bearings.

By means of the present invention the difficulties referred to are largely overcome and a more economical and efficient, yet less expensive, drying roll is provided.

[Price 3s. 0d.]

According to the present invention, a roll or cylinder for drying and cleaning the felts of paper-making machinery comprises a cage divided internally into segment-like compartments by radial divisions extending substantially the length of the cage and radiating from a central shaft journalled in bearings, these being between adjacent radial divisions, longitudinal stiffening members which divide the segment-like compartments each into an outer portion disposed at the periphery of the roll and an inner portion near the shaft, the said portions communicating with one another, one end of the cage being closed and the other being sealed by a non-rotatable plate having a suction outlet whereby, in use, with the felt passing over part of the roll, air, moisture and dirt may be sucked therefrom through the ends of the inner portions of the corresponding segment-like compartments.

The invention will be described further, by way of example, with reference to the accompanying drawings in which:—

Fig. 1 is a part sectional elevation of a drying roll or cylinder according to the invention;

Fig. 2 is a section on the line 2—2 of Fig. 1; and

Fig. 3 is an end view looking from the left-hand side of Fig. 1.

Referring to the drawings, the roll or cylinder comprises a cage 10 divided internally into segment-like compartments 11, as viewed in Fig. 2, by radial divisions or ribs 12 extending substantially the length of the cage and radiating from a central hollow shaft 13, so that the shaft 13 and cage 10 rotate as one. The shaft 13 is journalled in bearings 14 through the intermediary of trunnions 15 located in the end thereof. One end of the cage 10 is sealed by a non-

rotatable plate or disc 17 mounted about the shaft 13 and adapted to be located within a sealing annulus 18 fitted to the end of the cage 10. The inside face of the non-rotatable plate 17, the adjacent ends of the radial division or ribs 12 with the sealing annulus 18 are all faced with a self-lubricating material which provides an air-tight seal without undue friction.

The peripheral curved surface of the cage 10 is fashioned by winding a stout wire 19 around the outer edges of the radial divisions or ribs 12, the convolutions of the wire being spaced apart so as to form helical slits 20 which are subdivided by the divisions or ribs 12 and afford radial access to the compartments.

In order to provide additional rigidity, longitudinal stiffening members 21, each extending between adjacent radial divisions 12, are provided and so arranged as to divide each of the segment-like compartments into an outer portion disposed at the periphery of the roll, and an inner portion near the shaft, the said portions communicating with one another by apertures 22 in the longitudinal stiffening members 21. The stiffening members 21 are each provided with a radial rib 23 arranged normally thereto and adapted to give additional support to the wire 19.

The non-rotatable plate or disc 17 is provided with an arcuate suction outlet or aperture 24, and its size and disposition is such that it gives access to the ends of the inner sections of three consecutive compartments in the cage as they come into register therewith. If desired, the width of the opening may be varied by a movable shutter (not shown). Fixed to the plate 17 and covering the aperture 24 is one end of a suction pipe 25 connected to an exhaust fan (not shown).

In operation, the roll is arranged so that the felt of a paper-making machine passes over part of the surface thereof, so that it is rotated by the movement of the felt. As the roll rotates, the compartments 11 in turn come under the action of the exhaust fan, and moisture and dirt are sucked from the felt through the slits 20 into the outer portions of the compartments 12, through the apertures 22 into the inner portions of the compartments and are finally drawn from the latter, the suction aperture 24.

More than one of the rolls may be employed for drying and cleaning a single felt, and in such cases the felt may be arranged from one to the next on the "under and over" principle, so that it only covers a part of the curved surface of each roller. It will therefore be understood that the non-rotatable plate or disc 17 will be arranged so that its suction aperture 24 registers with

the inner portions of the compartments whose curved surface is covered by the felt, the remaining compartments being inactive, since they are not connected to the suction source.

Rolls as described above require much less machining in their manufacture than do the known rolls, and the shaft and cage can run on ball or other bearings.

What we claim is:—

(1) A roll or cylinder for drying and cleaning the felts of paper-making machinery comprising a cage divided internally into segment-like compartments by radial divisions extending substantially the length of the cage and radiating from a central shaft journaled in bearings, there being, between adjacent radial divisions, longitudinal stiffening members which divide the segment-like compartments each into an outer portion disposed at the periphery of the roll and an inner portion near the shaft, the said portions communicating with one another, one end of the cage being closed, and the other being sealed by a non-rotatable plate having a suction outlet whereby, in use, with the felt passing over part of the roll, air, moisture and dirt may be sucked therefrom through the ends of the inner portions of the segment-like compartments.

(2) A roll or cylinder as claimed in Claim 1 wherein each longitudinal stiffening member is provided with a radial rib.

(3) A roll or cylinder as claimed in Claim 1 or 2 wherein the peripheral curved surface of the cage is fashioned by winding a stout wire around the outer edges of the radial divisions, the convolutions being spaced apart so as to form helical slits which are subdivided by the divisions and afford radial access to the compartments.

(4) A roll or cylinder as claimed in any preceding claim wherein the non-rotatable plate is located within a sealing annulus fitted to the end of the cage, the inside face of the non-rotatable plate, the adjacent ends of the radial divisions and the sealing annulus being faced with a self-lubricating material.

(5) A roll or cylinder for drying and cleaning the felts of paper-making machinery, substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

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PROVISIONAL SPECIFICATION.

Improvements in and relating to Rolls or Cylinders for Drying and Cleaning the Felts of Paper-Making Machinery.

We, HALL & KAY LIMITED, a British Company, of Birch Mills, Ashton-under-Lyne, in the County of Lancaster, do hereby declare this invention to be described in the following statement:—

This invention has reference to machines for drying and cleaning lengths of cloth and like material such as felts used in the manufacture of paper, and has for its object to provide an improved roll for this purpose, which will be cheaper to manufacture and use than rolls now used for the same purpose and will be more efficient than such rolls.

In a known machine for drying and cleaning lengths of cloth and like materials, a fixed pipe having a perforated wall is mounted across the machine and on this there is rotatably mounted a circular cage or roll, also perforated, over part of the circumference of which there passes the web of the material to be dried or cleaned, the web being passed through the machine from one end to the other and rotating the cages or rolls as it progresses. During this time suction is applied to an end of the fixed pipe, the other end being closed, and the moisture or dirt in the web is sucked through into the fixed pipe and is drawn out of the machine.

The mounting of the rotatable circular cage on the fixed pipe is expensive as it has to be mounted on large roller bearings, and as the cages are often deflected by the weight and pull of the fabric passing over them the joins between the cage and the fixed pipe tend to bind and are not always as air-tight as they should be, in spite of expensive machinery.

By means of the present invention, the difficulties referred to are largely overcome and a more economical and efficient machine is produced at less expense.

According to the present invention, a machine for drying or cleaning is provided with rolls comprising a hollow rotatable cage mounted on a shaft and divided into sections by radial and longitudinal divisions, the shaft being mounted in bearings wherein it and the cage are rotated, one end of the cage being closed and the other being open but sealed by a non-rotatable plate having an opening to a suction outlet which draws the air, moisture and dirt from the ends of the sections in the cage as they pass across the opening.

According to one embodiment of the invention a circular cage is made of metal and is provided with a large number of openings extending in lines from end to end.

The cage is provided internally with radial longitudinal ribs resting on longitudinal supports to provide rigidity, and is provided with radial and longitudinal ribs extending inwardly to a central shaft which may be solid or tubular. These longer ribs also give support but their main purpose is to divide the whole length of the cage into a number of isolated sections. One end of the cage is closed and the other end is open.

The whole cage is mounted on a shaft mounted in end bearings so that the shaft and cage rotate as one.

Mounted about the shaft at the open end of the cage is a plate having an opening sufficient to allow access to the sections of the cage as they pass over it. The width of the opening may vary or be varied by a movable shutter but it will probably normally cover the open ends of three sections at a time. Fixed to this plate and covering the opening is the entrance to a suction pipe connected to an exhaust fan. The inside face of the plate and the adjacent ends of the radial arms and other parts of the cage in contact with the plate are carefully machined and may be faced with a self-lubricating material which will allow contact between the parts sufficient to provide an air seal without undue friction, as it will be appreciated that it is desirable to make the seal as air-tight as possible.

When the machine is in operation, the cage and shaft are rotated as one by the passage over the cage of the material and all sections in turn come under the section of the exhaust fan as the material is passing over the sections in communication with the fan. The machines in which these cages are used have each a number of such cages and the material is passed from one to the other on the under and over principle, and does not surround the cage but only covers a part thereof at any time, it will therefore be understood that the plate mounted in the end of the cage is turned so that its opening draws air from the sections whose curved surface is covered by the material, the remainder of the sections not at that time being subjected to any suction as they are cut off by the other part of the plate.

A machine made in this way has much less machining in it than have machines of the existing type and each shaft and cage can be run on ball or other bearings. Means
5 are provided to lubricate the engaging edge of the plate and the shaft.

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